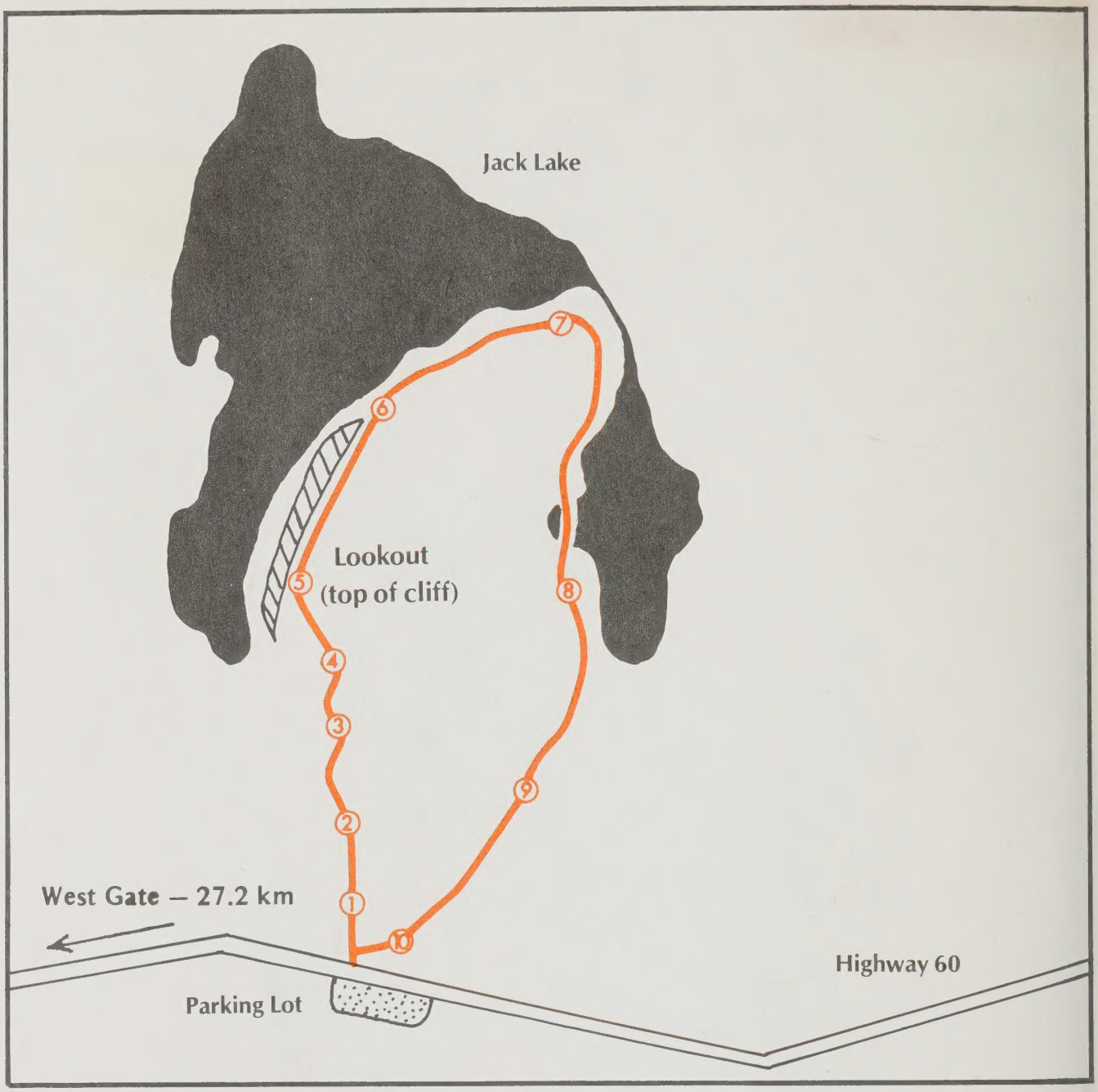
Hemlock Bluff Trail

Research in Algonquin

Hemlock Bluff Trail

Text by Dan Strickland

Drawings by Howard Coneybeare



The Hemlock Bluff Trail is a 3.5 km loop taking you through a typical west side Algonquin forest. The trail features fine stands of hemlock and an excellent view of Jack Lake.

The numbered sections of this guide correspond to numbered posts along the trail, and touch on some of the important findings gained through the many research programs which have been carried out in Algonquin Park. Have a nice day.

Post 1 An Outdoor Laboratory

You are now standing in a huge outdoor laboratory. True, you don't see any Bunsen burners or microscopes here, but what you do see—a great living system with thousands of individual plant and animal components, has enough raw material to occupy a hundred scientists for a hundred lifetimes.

The unravelling of the secrets surrounding you is of tremendous importance—not only for the sake of knowing for knowing's sake, but also because of its practical consequences. The more we know about the intricate interrelationships of climate, rocks and living things in Algonquin, the more wisely will we be able to manage and use the Park.

Over the last fifty years a great deal of research has been carried out in Algonquin by scientists from both the Ministry of Natural Resources and from universities across Canada. Well over 1000 scientific papers based on this research have been published on subjects ranging from wolves to blackflies, and from trees to you, the people using the Park.

There are four facilities in Algonquin where Park research is based: the Harkness Laboratory of Fisheries Research on Opeongo Lake, the Wildlife Research Station on Lake Sasajewun, the Timber Research Station on Swan Lake and the Park Museum. Except for the last of these, all are closed to the public—and you would probably be disappointed if you could visit them. They are really just places where the researchers hang their hats when the day's work is done. The real laboratory is here, out in the forest and lakes of Algonquin. While we cannot possibly cover the whole subject, we will, at the remaining posts, tell you of a few representative examples of research done in Algonquin Park.

Post 2 Who's Afraid of the Big Bad Wolf?

Everybody knows what a wolf is. As a matter of fact, our association with wolves goes back thousands of years. We have feared them, persecuted them, and wiped them out whenever we could. The astounding thing is that until very recently we knew next to nothing about wolves because no one, anywhere in the world, had ever bothered to study them.

This has changed considerably in the last few decades and one of the more important early studies was carried out right here in Algonquin between 1958 and 1965.

Until the study began, it was an article of faith that wolves were "bad" and every year 50 to 60 wolves were removed from the park by rangers spurred on by the provincial bounty of $25 per dead wolf. But no one knew what the role of wolves in the ecology of Algonquin really was, or even how many wolves there were. So the Ministry researchers set out to answer some very fundamental questions.

The intensive use of aircraft in winter made it possible to find and follow tracks of wolves on frozen lakes and thus to find and count the wolves themselves. Gradually, patterns began to emerge, showing that the population of wolves was about one per 10 square miles, grouped in packs of about 5 or 6 animals. The packs were almost always on the move, and many of their kills were on the ice, making it possible to land and examine the age and condition of the wolf's prey. Deer comprised almost all of the wolves' winter diet but almost 60% of the deer killed were 5 years old or older, past the prime of life. Such old deer accounted for only 13% of the deer

population as a whole — which meant that the wolves were eating mostly that small fraction of the deer population which was going to die soon anyway. The kills were almost entirely consumed but the little that was left provided an important, and in some cases vital, food supply for a host of other creatures, ranging from eagles and ravens to martens and foxes.

After the snow melts in late April pups are born, one litter of about 5 to a pack, and the number of wolves in the Park roughly doubles. The increase is only temporary, however, because by the following winter wolf numbers are back to what they were the year before. Most of the mortality occurs in pups or yearlings, with well over half failing to reach adulthood. This does not hold true, however, when man destroys wolves. In this case, more pups survive and the wolves are able to replace their lost numbers within a year or two. In this way it was strongly suggested that paying bounties to encourage the destruction of wolves (in non-Park areas of Ontario) was a complete waste of the taxpayers' money, and the government of Ontario accordingly abolished the bounty in 1972.

Yet another benefit to the public coming from the wolf research program was the discovery that wolves will respond to human imitations of their howls. This was an invaluable aid to the researchers in the difficult task of locating wolves in the summer when they are hidden by heavy forest cover. Today it is the chief means by which we introduce park visitors to one of Algonquin's most fascinating wild animals.

Post 3 A Green Thumb for the Yellow Birch

You are standing before a large yellow birch tree. You could hardly choose a better place in Canada to see a good example of this species because Algonquin Park lies in the heart of prime yellow birch range — the southern part of the thin-soiled Canadian Shield. Although the yellow birch has a rather restricted distribution, and accounts for only about 20% of the volume of hardwood timber cut in the province, it is a very valuable tree, being used for high quality veneer and saw logs (which are made into furniture). It generates a major portion of Ontario's hardwood logging revenue.

Although yellow birch had been logged in the Park since about 1920, the demand was not great until World War II when plywood began to be used in the manufacture of aircraft. As foresters turned their attention to the newly valuable tree, they noticed very quickly that there were very few, if any, small yellow birch growing up to assure a future supply. In fact, in some areas, 97% of the yellow birch was over 100 years old, and no one knew why there was such little regeneration, let alone how to solve the problem.

A tiny yellow birch seedling can be smothered by a leaf.

Something had to be done, so in 1950 the Ontario Government set aside 1120 hectares of hardwood forest near Swan Lake in Algonquin Park so that Ministry researchers could begin a close and systematic look at yellow birch. It was already known that yellow birch produces literally millions of tiny seeds, usually every three years or so, between September and January. When spring arrives, the seeds come to rest on top of the leaf layer on the forest floor, or are washed between the leaf layers by the spring run-off. Thousands of these seeds germinate, but the seedlings are so tiny that the root fails to penetrate through the layer of flattened maple leaves on the forest floor. In the case of seeds washed underneath the leaves, they are smothered by the leaves above. Either way, the result is the almost total elimination of all yellow birch seedlings in their first year of life.

Having narrowed down the problem, the researchers then tried different ways of removing the major obstacle to yellow birch regeneration — namely the almost impervious layer of old sugar maple leaves. Various mechanical devices were dragged over the forest floor to expose the mineral soil and this worked well. Even better was to burn the leaf layer in the fall so that a suitable seed bed would be waiting for the seeds the next spring. (In this the researchers were no doubt copying nature's method, since most of our stands of yellow birch probably date back to fall leaf fires hundreds of years ago when nobody was around to put them out.)

The battle was not over, however. The researchers found that even when the seedlings did get established, their growth was so slow that they were smothered by the following autumn's leaf fall. The solution to this problem turned out to be the removal of some of the overhead trees so that the seedlings received about 40% of the direct sunlight. Under these conditions the seedlings grew tall enough in their first year to avoid being smothered and later were able to outgrow competing sugar maple seedlings.

Thus the mystery of yellow birch

regeneration was solved, and today the knowledge gained through this Algonquin research is being applied far beyond the park boundaries.

Big yellow birch trees may be over 300 years old.

Post 4 If You're A Moose, Don't Eat Snails

Most people don't like to think about parasites. We are all vaguely aware that they exist, but since they are rather unpleasant and not very noticeable we usually prefer to forget about them.

Sometimes, however, even a tiny parasite has such enormous consequences for other animals that we simply cannot ignore its presence.

A classic example is the parasite which causes "moose disease". Moose affected by this disease are often ridiculously tame, walk in circles with the head twisted to one side, and sometimes they become blind. The hind legs are generally weak and uncoordinated and the animals stumble into trees and trip over logs. Finally, one or more legs become paralyzed and the moose, which can no longer walk, dies of starvation.

Moose disease may be the most disastrous disease affecting moose populations in eastern North America, but for many years following its discovery in the 1930's no one could provide a satisfactory explanation for it. Bacteria, viruses, and dietary deficiencies were all suggested as causes but there was no good evidence for any of these possibilities.

The breakthrough came in the early 1960's thanks to work done here in Algonquin by the Ontario Research Foundation. It was found that captive moose developed moose disease when they were infected by a tiny worm with the cumbersome Latin name, *Parelaphostrongylus tenuis*. This worm is commonly found in the brain and spinal cord of the White Tailed Deer, but there, the worms do almost no damage. In moose, however, they destroy much nerve tissue —

accounting for the symptoms seen in moose disease. It was found furthermore, that worm larvae were passed from a deer's body with the droppings, and then went on to infect any of several species of snails or slugs attracted by undigested plant material in the droppings. The larvae can then infect a moose or another deer when the snails are accidentally eaten with vegetation.

This research led not only to the identification of the cause of moose disease, but also to a much better understanding of many previously unexplained facts concerning deer and moose. It had long been known, for example, that moose were rare where there were large numbers of deer. It was also known, that many areas of the northern U.S. and southern Canada had been invaded by deer around the turn of the century following the creation of good deer habitat by logging and forest fires. Great die-offs of the native moose had followed but no one knew why until the Algonquin research pointed to a rational explanation. The moose were decimated by the parasite brought into their range by the deer. It may also explain the failure of attempts to reintroduce moose (or elk and caribou which the worm also kills) back into areas they had occupied before deer took over. As long as deer remain plentiful such reintroductions are probably doomed.

Here in Algonquin, we are presently witnessing an interesting illustration of this. Deer are declining in the Park because our forests are becoming more mature and hence providing far less food for deer than they did 30 or 40 years ago. But fewer deer mean fewer worm infected snails, and this in turn means that moose have much less chance of getting moose disease. Sure enough, moose are becoming more plentiful in the Park every year. It's rather startling to think that the largest animal in Algonquin is so much at the mercy of a tiny parasite most of us will never see.

Post 5 A Fish Story

Fisheries research in Algonquin began in 1936.

Far below you is Jack Lake, and this introduces a whole new area of Algonquin research, — namely, fisheries. It is truly an enormous subject since a great variety of fisheries research projects have been going on in the Park every year since 1936. That was the year Highway 60 was completed through the Park, and the superintendent of the time was concerned about the increased pressure which would be brought to bear on Algonquin fisheries. He had accordingly asked Dr. W.J.K. Harkness of the University of Toronto to establish a field station in Algonquin and the invitation was accepted. From these beginnings the laboratory, which now bears the name of its late founder, has been the focus of fisheries research in Ontario. The list of teachers and students who have worked there reads like a "who's who" of senior government and university personnel. The research carried out has been in four main areas. One has involved studies on the productivity of lakes (dealing with the physical and chemical characteristics of lakes which determine the ultimate production of fish). The others have been detailed and long term studies on the depth distribution, movements, food habits, growth rates and reproduction of Algonquin's two main game species, the lake trout and the brook trout, (and also the introduced small-mouth bass). A great deal of our basic knowledge and management techniques in these areas are based on this research. We cannot possibly do justice to the subject in this short space, however, so for those wishing to know more about Algonquin fisheries research and management, we recommend our booklet "Fishing in Algonquin Provincial Park".

Post 6 The Best of Both

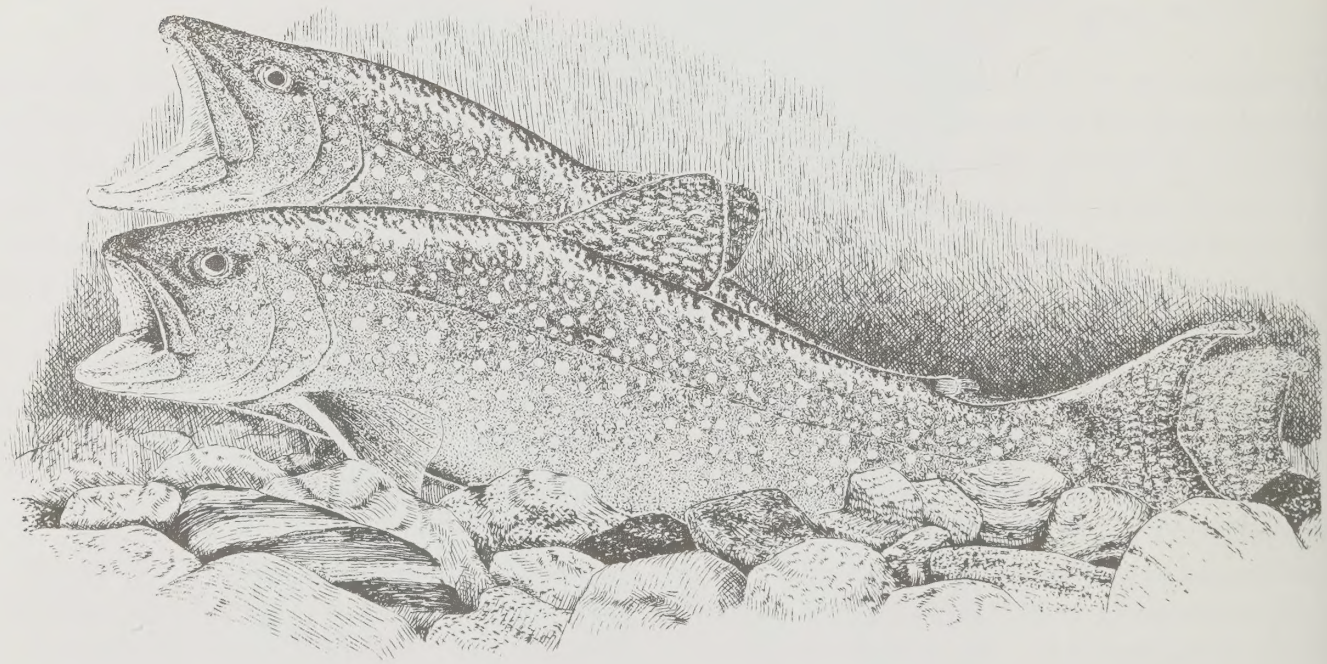
At the last post we mentioned that the main game fish in Algonquin were the lake trout and the brook (or speckled) trout. What we did not mention is that these two fish can be artificially cross-bred to produce another fish called the splake. The hybrid combines many of the desirable qualities of both parents—excellent taste, fast growth, and plenty of fight.

Splake research in Algonquin began in 1954 with the planting of the hybrid in three lakes. Of these, Jack Lake soon distinguished itself as being excellent for the survival and growth of splake. For example, 65% of the splake planted in 1954 were recovered by fishermen and an additional 10% by experimental nets, as opposed to total recoveries of less than 2% in other lakes. The growth of the fish was truly remarkable. Splake planted in Jack Lake as yearlings (about 10 cm long) had reached lengths of over 30 cm by October of the same year. They averaged 4 cm longer than native brook trout, and 15 to 25 cm longer than lake trout. After four years, the planted splake were over 50 cm long and weighed over two kilos.

With performance like that, it was obviously worthwhile to take a close look at the habits and life history of the hybrid, and Jack Lake was clearly a choice study area.

Investigations showed that in the summer months splake have a very strong schooling behaviour, resulting in large catches in a short period, followed by hours of no bites at all. Otherwise, they behave much like brook trout, taking similar foods, and preferring the transition layer, usually between 6 and 11 metres in depth, between the warm surface layer and the cold depths.

Perhaps the most interesting discovery was made in 1959 when splake were seen spawning—the first time it had ever been observed in nature. The fish showed their hybrid parentage by spawning both at night and on rocky shoals (like lake trout) as well as during the day and on sandy-gravelly shoals



Splake spawning in Jack Lake.

(like brook trout). When it was decided to do a detailed study of the spawning behaviour and requirements of splake, Ministry researchers naturally turned to Jack Lake, and for this purpose the lake was closed to fishing from 1970 through 1974. During this period, the spawning behaviour, including the deposition of eggs, was filmed and special equipment was used to record the sounds made by the fish. Information was collected on the precise nature of natural and modified spawning beds and on the incubation of fertilized eggs on these beds and back in the laboratory.

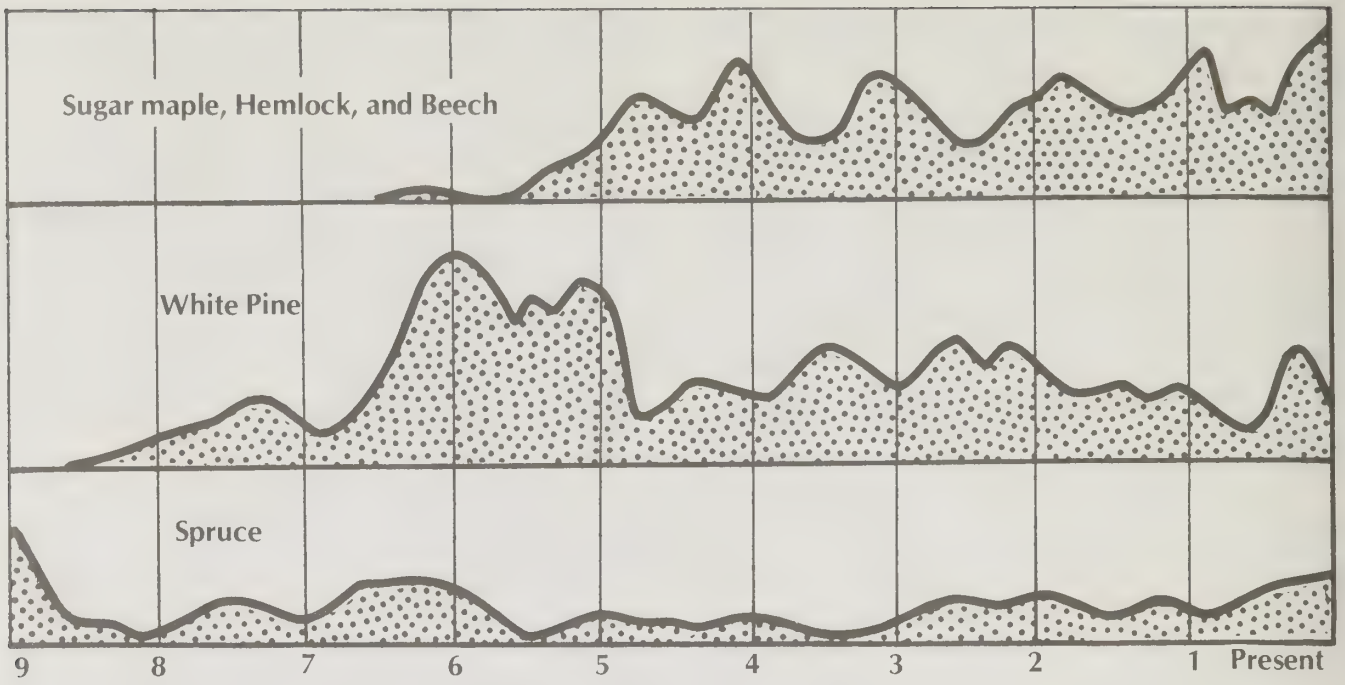
Such detailed information will be of great importance in establishing self-reproducing hybrid populations, inside and outside Algonquin. In fact, in Lake Huron we are already applying our new knowledge — knowledge that came from research done right here at Jack Lake.

Post 7 The Answer My Friend, is Lying in the Ooze

A core of mud being taken from the bottom of Found Lake in March 1973.

Anyone who has done any thinking about Algonquin Park sooner or later starts to wonder just what our forests were like 500 or 1000 years ago. We know they have been significantly modified during the last century and a half by logging and the unnaturally large and frequent forest fires of the late 1800's and early 1900's. But what were they really like before the loggers arrived? Did big white pines always tower above hardwoods on the west side of Algonquin, or were hardwoods growing up under and replacing a more nearly pure pine forest? How important were forest fires in the natural turnover of Algonquin forests, and how often did they occur under natural conditions?

Until recently, it seemed we would never have answers to these questions. But now, incredible as it seems, answers are in fact emerging from, of all places, the bottom of two Algonquin lakes. One of these is little Found Lake beside the Park Museum. To understand why it is so special you have to know that Found Lake is amazingly deep for such a small body of water, over 30 metres deep in fact. This, plus the fact that very little water flows into or out of the lake, means that the deep water doesn't circulate. It just sits



there and the oxygen it originally contained was mostly used up thousands of years ago. The lack of oxygen results in a total lack of living things which could stir up the ooze on the bottom or decay the yearly sediment.

In every lake, material is continually settling out on the bottom — silt brought in by drainage into the lake, the dead bodies of tiny plants and animals living in the warm water near the surface, and pollen blown onto the lake from the surrounding country. But it is only during the summer that silt is being brought into the lake so material settling on the bottom at that time can be distinguished from the more organic material which settles out in winter. If things always stayed that way, every lake would have a year by year layering of its bottom mud. In most lakes, however, the neat layers are destroyed by the movements of bottom living organisms. So it is only at the bottom of a truly exceptional lake like Found Lake where there is nothing to stir things up that the layering is preserved — winter layers alternating with summer layers for the last 9200 years.

Not only are the layers preserved but also the individual pollen grains within them. Thus we can go to the layer for the year 5240 B.C. for example, and see what kinds of pollen fell into the lake that year — and from this tell something about the forests growing around Found Lake at that time.

This is precisely what researchers from the Royal Ontario Museum have done (by studying a core taken from the bottom of Found Lake up through the ice in the winter of 1973). The results of their painstaking examination of the pollen from the various layers are shown in the diagram. It will be seen that spruce were the first trees to invade the Found Lake area after the retreat of the glacier. The spruce were succeeded by pine, and then about 5000 years ago, by a forest very similar to what we see today, with maple, hemlock, birch and beech.

But this is only one of the stories Found Lake can tell us. By analyzing the layers for charcoal fragments we should be able to determine precisely when and how often forest fires occurred before the white man arrived, and just how important the influence of fires was in the natural scheme of things.

Not bad for a lot of gooey mud!

Post 8 You're Surrounded by Martens

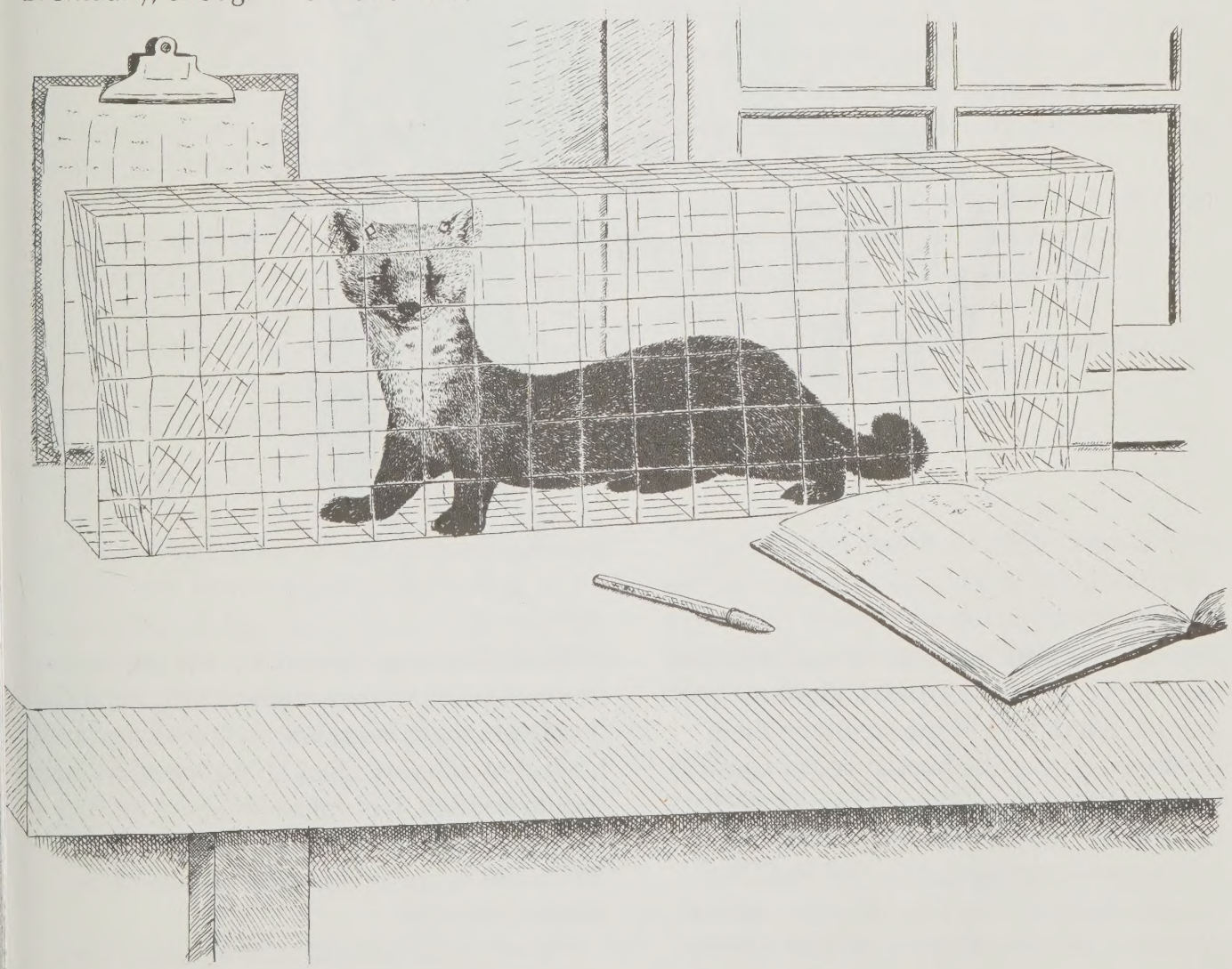
Many visitors to Algonquin have never heard of the marten and most have never seen one. Nevertheless, you are in real marten country in Algonquin Park and if you have been

watching closely you will have seen plenty of scats on the trail itself or on top of logs in the bush nearby.

Actually, the history of martens in Algonquin is one of the Park's real success stories. For much of this century, the marten was virtually extinct in most of Ontario, and Algonquin (thanks to protection from trapping) was one of the animal's very few strongholds, and the only one in deciduous forest.

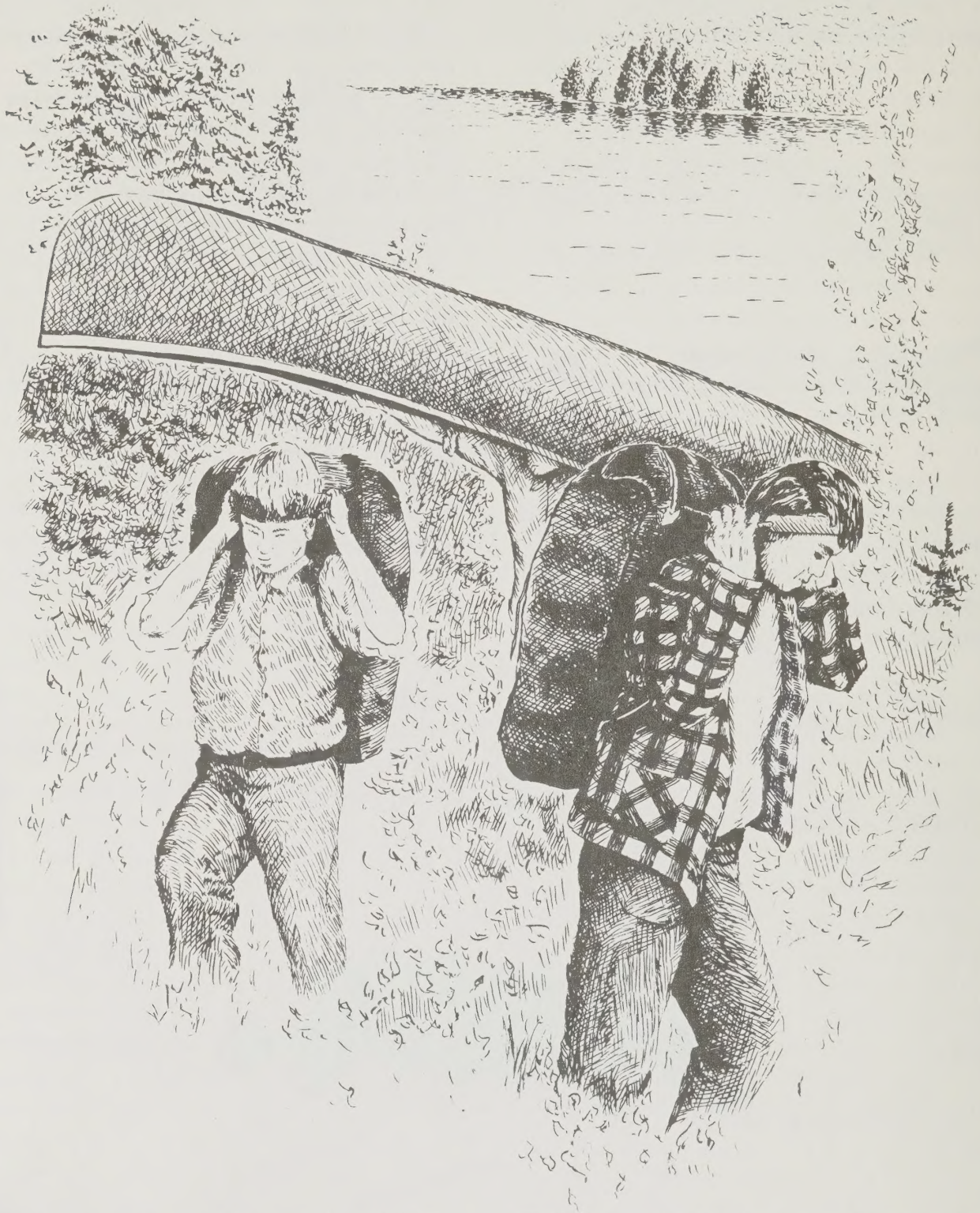
For these reasons, the Park was a logical place to undertake a detailed study of the movements and food habits of this handsome weasel, long sought by trappers but about which very little was known. The researchers approached the problem of movements by choosing a 12 square km study area (you are standing in it right now) and establishing a grid system of 153 live traps which were then patrolled daily. Captured animals were marked with ear tags so that they could be positively identified when re-trapped. Eventually, enough information was collected to show that there was about one marten per square km here, rising to about two when the young left their mothers in August. Males had an average home range of almost 400 hectares—three times larger than the home range of females. Contrary to popular belief, the marten were found to spend most of their time on the ground and they were especially fond of using fallen logs as pathways. Food habits were studied by analyzing hundreds of scats collected during the study. Small mammals such as meadow voles and chipmunks were very prominent in the marten's diet and, surprisingly, so were birds' eggs and berries in season.

It is a pretty safe bet that you will not see a marten during your stay in Algonquin—but you can always hope. The research done right here has proven that by the time you have returned to the highway you will have walked through ground occupied by at least 2 and perhaps 5 martens. Believe it or not, you're surrounded!



A marten in its live trap back in the lab.

Post 9 You, Under the Microscope



It comes as a great surprise to most people to learn that Algonquin's most important animal, not only in influence but in sheer numbers, is us — the human being. Close to three quarters of a million of us visit the Park every year, of whom about 120,000 camp in Highway 60 campgrounds, and 60,000 go into the Park interior. Even this one trail has about 15,000 people going around it every year.

There is no doubt about it — the animal we humans are most likely to see in Algonquin is another human. Since we so often disagree or have contradictory ideas about how the Park should be used, it is not always easy for Park Managers in the Ministry of Natural Resources to get an objective picture of our visitors' attitudes.

Yet we must have just such a picture if we are going to find solutions to people

problems. Accordingly, you, the park visitor have been the subject of several research projects, and you probably will be in the future as well.

Since the huge interior canoe route network is Algonquin's most unique and valuable resource, a study done in 1970 on users of this resource is of particular interest.

Not surprisingly, questionnaires filled out by canoeists indicate that the main attraction of the Algonquin interior is "getting away from it all", "lack of people", or "isolation in a natural setting". This clearly rules out putting more highways into the Park interior since the vastly increased traffic would seriously degrade the most valued qualities (isolation, peace and quiet) sought after in the Park Interior. By the same token, the presence of motorboats is clearly a major source of dissatisfaction to interior users and it has accordingly become government policy to phase them out of the park.

But even the presence of other canoeists is a threat to the "get away from it all" quality of the interior because 71% of canoeists do not like to camp within sight of another party and most consider that a lake with 3 occupied campsites is crowded. We have responded to this problem up to a point by publicizing other access points on the park map in an attempt to spread out use as uniformly as possible over the whole park.

But the park is only so big, and it is obvious that continued increases in numbers of people using the interior could only result in most of the park being unsatisfactorily "crowded", no matter how well spread out the canoeists were. The resource would be degraded or destroyed by those very people who came to enjoy it. This is why limits were set in the 1974 Algonquin Master Plan on the total number of canoes entering the Park Interior each day at each access point. Except for busy summer weekends, it will be a number of years before the access point quotas will be filled very often. But the day will come, and it is best that we all understand well in advance why such limits are necessary.

In the meantime, there are other other more immediate problems we are tackling. One is the matter of garbage on interior campsites and portages. Almost half the interior users expressed dissatisfaction with garbage (presumably left by people in the other half!). Publicizing the problem and asking people to pack out their unburnable garbage in the litter bags issued to them has helped, but not enough. In 1973, for example, we still had to fly 10 tons of garbage out of the interior and in that year it became government policy to introduce a ban on cans and bottles in Algonquin (with the exception of organized campgrounds along Highway 60).

On the bright side, over 90% of canoeists and fishermen indicated they were at least fairly satisfied with their trip in the Park Interior.

With your input into our management, we hope to keep it that way.

Post 10

We hope you have enjoyed your walk around the trail and learning something of the importance of Algonquin as a living research laboratory. For those wishing to delve into the subject further, a bibliography of Algonquin Park research is available on request at the Park Museum.

If you do not intend to take this guide home with you, please put it in the box at this post. If you wish to keep the guide, please pay at the trail entrance sign if you have not already done so. Thank you.

OTHER ALGONQUIN TRAILS

This is just one of ten trails maintained in the Highway 60 region of Algonquin Provincial Park. Each is designed to introduce you to some specific aspect of the Park and each has a guide similar to this one. The nine other trails are listed below (distances are from the West Gate).

WHISKEY RAPIDS TRAIL (AT KM 7.2) This trail is a 2.1 km loop leading along the Oxtongue River to Whiskey Rapids. The trail guide discusses the ecology and history of an Algonquin river.

HARDWOOD LOOKOUT TRAIL (AT KM 13.8) This 0.8 km walk takes you through a typical Algonquin hardwood forest and culminates in a fine view of Smoke Lake and the surrounding maple hills. The guide offers some insight into the ecology of a hardwood forest.

MIZZY LAKE TRAIL (AT KM 15.4) This 11 km trail requires an early start and a full day to do properly. It visits nine ponds and small lakes and affords some of the best chances to see wildlife in the Parkway corridor.

PECK LAKE TRAIL (AT KM 19.2) The Peck Lake Trail is 1.9 km long and goes completely around the shoreline of Peck Lake before returning you to the parking lot. The trail guide explores the ecology of a typical Algonquin lake.

TWO RIVERS TRAIL (AT KM 31.0) The Two Rivers Trail is 2.1 km long, making an easy ascent to a pine-clad cliff overlooking the north branch of the Madawaska River. The guide examines the importance of change in the natural and present day Algonquin Forests.

LOOKOUT TRAIL (AT KM 39.7) This 1.9 km loop is a fairly steep and rugged trail which rewards the hiker with a magnificent view of several hundred square kilometres of Algonquin. The trail guide discusses the geology of the Park.

BOOTH'S ROCK TRAIL (SOUTH FROM KM 40.3) This 5.1 km loop trail starts one km south of the Rock Lake Campground office (8 km south of Highway 60). The trail skirts two small lakes, climbs to a spectacular lookout, and returns via the ruins of an old estate and an abandoned railroad. The trail guide explores the theme of man's impact on Algonquin.

SPRUCE BOG BOARDWALK (AT KM 42.5) This unusual 1.5 km loop takes you through the best bog situation in the Highway 60 area. It is provided with several extensive boardwalk sections and gives the Algonquin visitor an excellent close-up look at the flora and fauna of two typical northern spruce bogs. The trail guide relates the history and ecology of the bogs.

BEAVER POND TRAIL (AT KM 45.2) A winding trail of 2.0 km through rugged hilly country yields close-up views of two beaver ponds, including a fine, bird's eye view from a rocky bluff. The trail guide provides an introduction to Algonquin's fascinating beaver pond ecology.

Published in cooperation with the Ontario Ministry of Natural Resources by:

THE FRIENDS OF ALGONQUIN PARK

The Friends of Algonquin Park
P.O. Box 248
Whitney, Ontario K0J 2M0

1991